

UNITED STATES PATENT APPLICATION

FOR

SYSTEM AND METHOD FOR ANIMATED CHARACTER  
PHOTO-EDITING INTERFACE AND CROSS-PLATFORM  
EDUCATION ICON

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SYSTEM AND METHOD FOR ANIMATED CHARACTER  
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5                    CROSS-REFERENCE TO RELATED APPLICATIONS

                  This application claims the benefit of the filing date of U. S.  
                  provisional patent application, entitled "Animated Character Photo Editing  
                  Interface", serial number 60/181,840, filed February 11, 2000, and further  
10        claims the benefit of the filing date of U. S. provisional patent application,  
                  entitled "Cross Platform Education Icon", serial number 60/181,787, filed  
                  February 11, 2000.

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## BACKGROUND OF THE INVENTION

### (1) Field of the Invention

5 The present invention relates to the field of digital photography. In particular, the present invention relates to an apparatus and a method for showing a user how to operate photo-editing software in either a workstation or in a digital camera.

### (2) Description of Related Art

10 Image editing is a process that may entail a large number of potential procedures. There may be dozens of types of edits that may be used, such as correcting for exposure, color balance, cropping, and many other attributes of a photographic or other image. Furthermore, the editing may take place at different stages of the photographic process. It may take  
15 place within a digital camera, within a workstation, or over the Internet at a remote user's station. In past embodiments of editing software, different user interfaces have been used during each procedure of the process. This has made learning and using the different editing software more difficult and time consuming. Therefore, a method for presenting photo editing for  
20 user convenience is at issue in photo-editing systems.

## SUMMARY OF THE INVENTION

5 A system and method for indicating suggested user responses is disclosed. The method includes loading an image into an image-editing equipment. The method further includes determining a set of quality-related problems of the image using software. An animated icon is displayed in conjunction with the image, and indicates a suggested user response to one of the quality-related problems. Other embodiments may include matching a corrective function with one of said set of quality-related problems, and indicating the suggested user response in response to the matching. Further embodiments may perform the indicating by having the animated icon proffer a tool icon, or by performing a related editing to the animated icon. Finally, in other embodiments the method may include moving the animated icon to an alternate image-editing equipment.

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## BRIEF DESCRIPTION OF THE DRAWINGS

The features, aspects, and advantages of the present invention will become more fully apparent from the following detailed description,

5 appended claims, and accompanying drawings in which:

Figure 1 is a block diagram of a photo editing and camera system, according to one embodiment of the present invention;

Figure 2 is a block diagram of a photo editing system, according to the Figure 1 embodiment of the present invention;

10 Figure 3 is a block diagram of a camera, according to the Figure 1 embodiment of the present invention;

Figure 4 illustrates an icon demonstrating a brightness correction function on the image, according to one embodiment of the present invention;

15 Figure 5 illustrates an icon demonstrating a brightness correction function by changing the icon's brightness, according to one embodiment of the present invention;

Figure 6 illustrates an icon demonstrating a cropping function by showing scissors and cut lines on the image, according to an embodiment  
20 of the present invention;

Figure 7 illustrates an icon demonstrating a cropping function by showing a cropped icon and cut lines on the image, according to an embodiment of the present invention;

Figure 8 illustrates an icon traveling between devices, according to one embodiment of the present invention;

Figure 9 illustrates a computer software configuration item module diagram, according to one embodiment of the present invention; and

5        Figure 10 is a data flow diagram of one embodiment of the present invention.

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## DETAILED DESCRIPTION

In the following description, numerous specific details are set forth to provide a thorough understanding of the present invention. However, one  
5 having an ordinary skill in the art will be able to practice the invention without these specific details. In some instances, well-known circuits, structures, and techniques have not been shown in detail to not unnecessarily obscure the present invention.

An animated character is used for photo-editing. This animated  
10 character may look for potential problems in a photographic image, and then demonstrate a chosen corrective function by example. As more people wish to take advantage of the superior functionality of digital cameras, potential problems will occur because editing images can be a confusing and complicated process. This invention seeks to provide a means to  
15 simplify and enhance both the user experience and the end result that should be a printed or displayed image. The idea is to create an animated character that would operate in conjunction with an image editing software module, either on a computer, in a camera, or in another device. The character could even move between devices to demonstrate how a function  
20 or operation could be achieved on each device. In order to enhance the user experience, the software module could first look for potential problem areas in the image, such as over-exposure or improper color balance. The animated character could then indicate the area of concern to the user and suggest possible corrective functions. To further enhance this interaction,  
25 the character could demonstrate the function by adjusting, for example, the brightness on the image, or the character itself could become brighter or darker. In another example, with image cropping, the character could appear with a pair of scissors and demonstrate a cutting motion, or the

character itself could have its top and bottom "cropped" to demonstrate the effect. To further enhance the user experience, the user could modify the personality of the character to suit the user.

5 An integrated user interface in the form of an icon character is used that guides, educates, and entertains by moving across devices and indicating actions being executed. Digital image editing and data transfer is a complicated, time-consuming process. This icon character may not only educate the novice user, but may also entertain the user during a time-consuming computational process. A unique feature is the ability of  
10 this tutorial character to move from device to device (i.e. from computer to camera and back again). Although some computerized tutorial characters do exist, this one is unique because, among other things, it can travel across devices. Therefore, the end user does not have to invest any extra time learning to work with a different tutor for each new context. Target  
15 applications for the animated icon may be software algorithms on any device that accept parametrical input that describes the character's appearance, as well as its associated information.

Referring now to Figure 1, a block diagram of a photo editing and camera system is illustrated, according to one embodiment of the present  
20 invention. Personal computer 110 may be used in a workstation configuration with monitor 126, keyboard 120, and mouse 116 to edit photos or other images which may be taken with camera 150. Data may be exchanged between personal computer 110 and camera 150 via a local interconnect, which in one embodiment is Universal Serial Bus (USB) 142,  
25 or may be physically exchanged via a transportable memory card 140. Memory card 140 may be one of several common formats, such as SmartMedia, Memory Stick, or PC Card.



Personal computer 110 may include removable media 112, which may be a removable magnetic disk, optical disk, or tape, and provide a memory card mount 114 to receive memory card 140. Personal computer 110 may be connected via an interface 118 to a wide-area network (WAN) 122. In one embodiment, WAN 122 is the Internet.

Camera 150 may include a liquid-crystal display (LCD) 160, a viewfinder 152, a pushbutton control 154, and a rotary switch control 156.

Personal computer 110 may display photos or other images on the display screen 128 of monitor 126. Camera 150 may display photos or other images on the LCD 160. In each case, an animated icon 130 or 162, is displayed on display screen 128 or LCD 160, respectively. Animated icon 130, 162 may guide a user in the photo or other image editing process.

Referring now to Figure 2, a block diagram of a photo editing system is illustrated, according to the Figure 1 embodiment of the present invention. Personal computer 110 may include a WAN interface 208, a central processing unit (CPU) 210, a memory 212, a system disk 214, a removable media 112, a USB interface 222, a memory card mount 114, a graphics interface 224 supplying monitor 126, a keyboard/mouse interface 226 supplying keyboard 120 and mouse 116, and a local area network (LAN) interface 228. These functional units may be connected via a system bus 220. Memory 212 may include volatile random-access memory (RAM), programmable read-only memory (PROM), non-volatile Flash memory, or any other kind of memory. Removable media 112 may be a floppy disk, a removable magnetic disk, an optical or magneto-optical disk, semiconductor memory, or magnetic tape.

In one embodiment, the image displayed upon monitor 126 is processed by software stored locally in memory 212 or on system disk 214.

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In other embodiments, the software may be stored and executed on a remote server (not shown) connected via WAN 122, which may be the Internet. In the case the software is stored on the remote server, the user of personal computer 110 may not need to purchase a license for the software. In one embodiment, the use of the software is paid for by revenues generated by banner advertisements on pages accessible through WAN 122. User access of the software may trigger payments by the advertiser to the host of the banner advertisements. In an alternate embodiment, the use of the software is paid for on a per-transaction basis by the user of personal computer 110. This per-transaction payment may be made by cash, by a user account, or by redeeming bonus credits from various web-based businesses.

Referring now to Figure 3, a block diagram of a camera 150 is illustrated, according to the Figure 1 embodiment of the present invention. Camera 150 may include a charge-coupled device (CCD) 308 for image capture, a CPU 310, memory 312, a USB interface 322, a memory card mount 314, a user interface 316 for supporting the actions of pushbutton control 154 or rotary switch control 156, and a LCD interface 324 supporting the display upon LCD 326. The functional units may be connected via a system bus 320.

Referring now to Figure 4, an icon demonstrating a brightness correction function on the image is illustrated, according to one embodiment of the present invention. In one embodiment, the image 412 is displayed on the display screen 128 of monitor 126. In other embodiments, the image 412 could be displayed on the LCD 160 of camera 150.

Exemplary dark image 412 is shown as lacking in brightness. Problem detection software running in personal computer 110 may identify

the lack of brightness as a problem, and may task animated icon 430 to bring this situation to the user's attention. For this reason, animated icon 430 is shown proffering a light bulb icon 432, indicating to the user that the brightness function should be executed.

- 5 Referring now to Figure 5, an icon demonstrating a brightness correction function by changing the icon's brightness is illustrated, according to one embodiment of the present invention. In the Figure 4 embodiment, the animated icon 430 would proffer the light bulb icon 432 to indicate that the brightness function should be executed. In contrast, 10 the Figure 5 embodiment uses animated icon 530 where animated icon 530 can change from bright to dark and back again continuously to indicate that the brightness function should be executed on dark image 512.

- Referring now to Figure 6, an icon demonstrating a cropping function by showing scissors and cut lines on the image is illustrated, according to 15 an embodiment of the present invention. Exemplary image 612 requires cropping at the indicated cut line 614. Problem detection software running in personal computer 110 may identify the compositional flaws of image 612, and task animated icon 630 to bring this situation to the user's attention. For this reason, animated icon 630 is shown proffering a 20 scissors icon 632, indicating to the user that the cropping function should be executed. The scissors icon 632 may be making a cutting motion to make clear the need for cropping.

- Referring now to Figure 7, an icon demonstrating a cropping function by showing a cropped icon and cut lines on the image is illustrated, 25 according to an embodiment of the present invention. In contrast with the Figure 6 embodiment, in the Figure 7 embodiment the animated icon 730 itself is shown as cropped by icon cut line 732. The presence of the

animated icon 730 itself indicates to the user that the cropping function should be executed. As a supplemental indicator, cut line 714 may also be displayed.

Referring now to Figure 8, an icon traveling between devices is illustrated, according to one embodiment of the present invention. Animated icon 830 is shown on the display screen 128 of monitor 126, and animated icon 860 is shown on the LCD 160 of camera 150. In one embodiment, animated icon 830 is generated by software residing within personal computer 110. In an alternate embodiment, animated icon 830 is generated by a remote server connected via WAN 122. As an example, WAN 122 is the Internet, and animated icon 830 is generated by a Java applet.

Animated icon 830 may be moved 840 to appear as animated icon 860 on LCD 160 across a direct connection, such as exemplary USB 142, or by transportable media, such as exemplary memory card 140. Portable code may be used to generate animated icon, such as a Java applet. The animated icon 860 may have access to differing image-editing functions in the camera than in the personal computer 110. For example, in the brightness example of Figures 4 and 5, brightness of the images 412, 512 could be changed by software manipulation. However, animated icon 860 may indicated other solutions to image problems when operating within camera 150. Brightness could be changed by re-shooting the image with a flash attachment, and the animated icon 860 could indicate this alternative.

In alternate embodiments, animated icon 860 could be locally stored and generated within camera 150, and moved 850 to the display screen 128 for personal computer 110 via a direct connection or by transportable media.

Referring now to Figure 9, a computer software configuration item (CSCI) module diagram is illustrated, according to one embodiment of the present invention. In alternate embodiments, other allocations of functions to modules may be made. Memory area 900 may be in volatile memory, such as RAM, or in non-volatile memory, such as Flash, or in a mixture of the two. In the case where memory area 900 is within a personal computer 110, an image capture module 910 may be used to import photos and other images. In the case where memory area 900 is within a camera 150, a camera control module 920 may be used to take photos and import photos and other images.

Once a photo or other image is within the system including memory area 900, a problem detector module 930 may be invoked. Problem detector module 930 may examine the photo for quality-related problems, such as brightness, over-exposure, or improper color balance. The problem detector module 930 may examine the image-processing function modules function 1 940 through function N 948 in order to determine which problems may be solved within the current processing environment. If a match between kind of problem and function module exists, then icon generator 950 produces the animated icon indicating the appropriate remedial action to the user. The display driver 960 may show both the image and the animated icon on the display device.

Referring now to Figure 10, a data flow diagram of one embodiment of the present invention is illustrated. In alternate embodiments, the order of the procedures shown in Figure 10 may be changed to any order, and other procedures may be used. In procedure 1010, one or many images are loaded into the image processing computer or camera. The images may be loaded from local storage, from a transportable media or direct connection from a camera, or from a server on a WAN such as an online service. In

procedure 1020, the user selects a particular image to edit. The selection of the image initiates procedure 1030, where the animated icon is generated and displayed. Then the user may either decide, in procedure 1032, to let the software guide their editing, or may decide, in procedure 1034, to perform some of the procedures manually. In either case, at procedure 1040 the software problem detector detects quality-related problems with the image. In one example, the problem is bad contrast. For problems with a software corrective function, the appropriate function is initiated (e.g. the contrast function) at procedure 1050, and the animated icon is directed to indicate the suggested use of the tool to the user at procedure 1060.

In the foregoing specification, the invention has been described with reference to specific embodiments thereof. It will however be evident that various modifications and changes can be made thereto without departing from the broader spirit and scope of the invention as set forth in the appended claims. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense. Therefore, the scope of the invention should be limited only by the appended claims.